

ENTOPATH NEWS

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No. 19

October 1958

INTRODUCTION

The wet summer certainly seems to have produced an unusually fine harvest of pathological queries. Insects, especially aphids, on the other hand have not generally appreciated the continuous dampness and, with a few exceptions, their attacks have been below the general level.

In particular the wet season has led to death of roots of both seedlings and transplants in forest nurseries. It is uncertain to what extent this trouble is due directly to the waterlogging of the soil, or how much of it is caused by fungi encouraged by the wet conditions. At any rate small plants with dead roots have poured into Alice Holt in a steady stream.

Most publications at one time or another suffer from misprints which escape their editors' eyes and persist in the final article to annoy readers. "Entopath" is no exception. The first paragraph of the first issue was marred by ".....will find in it's pages....."; in our last issue "ROTHOLY" was printed for "ROTHOLZ". We would like to apologise for such errors and to tell you that we are changing our proof reading system in an effort to avoid them in the future.

NEOMYZAPHIS YET AGAIN.

Following the note in Entopath No. 17, asking for your observations on the recovery of spruces after Neomyzaphis defoliation, a few most interesting reports have been received. We would like MANY MORE please.

We shall hope to give you a full account of this "Survey" in a later issue, but meanwhile you will be interested to have a titbit or two. So far reports have come in from Kent, Sussex, Norfolk, Yorkshire, Fife, Dumfries and Mid Lothian, and have included notes on crops from transplant stage up to 30 years old.

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In only one case has death of Sitka occurred (up to 10-15% in a 2 acre plot) and that in an eleven year old acquired crop. The plants are sitting in a frost hollow and deaths, from one cause or another, have been observed for the last 6 years. It appears that Neomyzaphis has here tipped the balance on an unsuitable site. There is also a report of a small number of Picea alba and P. englemannii dying in a nursery in East Scotland. In all other cases, however, recovery is said to have been complete - sometimes to the astonishment of local staff. Interesting is the report from Fife where defoliation was extreme in 1957 and where no growth of leaders at all took place that year - new shoots, however, appeared in 1958.

Now, please, let us have more observations.

ASCOCHYTA PINIPERDA.

This is a fungus which has been infrequently recorded as a parasite of Norway spruce seedlings in the nursery. Most of the reports are from Europe, especially Scandinavia, but it has been found in Britain. The last British record we could find was in 1920 from Scotland. This paucity may be due to the genuine rarity of the fungus, but it may be partly due also to damage by Ascochyta being confused with that caused by other agencies.

The fungus attacks the developing shoots in early summer and can kill young seedlings or seriously affect height growth of older ones. The shoot wilts and the needles turn brown during summer and autumn, so that superficially the symptoms resemble those of frost or Botrytis damage. Close inspection, using a hand lens, however, will disclose the presence of numerous round, black fruit bodies on the dead needles and shoots. These are the pycnidia of the fungus, of which many may be found projecting through the epidermis on a single needle. No perfect stage is known.

This autumn among the minor queries we received three separate lots of 1+1 Pinus contorta from three different areas in Scotland. All showed the same features - browning of needles and death of part or all of the leading shoot. Examination showed the presence of Ascochyta piniperda on needles and shoots. This is apparently

the first record of it on a host other than spruce. In all three cases the damage to the stock generally was considerable and was causing concern. No damage was reported on spruce in any of the nurseries involved.

The advice given was to hand pick and burn infected plants and then spray the lines or beds with Bordeaux mixture. It was also considered advisable to avoid the infected sections of nursery for both P. contorta and spruce in next season's sowings.

The appearance of the fungus on the same species at the same time and within the same area raises some interesting questions. Foremost is the possibility of the plants having a common origin either of seed or nursery. We hope to follow this up and trace their history. There is also the possibility that a strain of Ascochyta peculiar to pine has developed. We have the fungus in culture and hope to carry out some cross inoculation tests on pines and spruces next season to test this idea.

BURNING OUT THE OAK.

On December 5th last year the hollow interior of the very old and decrepit oak that stands in front of Alice Holt caught on fire. The dry rotten wood inside the hollow stem burnt so furiously in the draught provided by a convenient hole near the base, that flames spouted high out of the open top and the fire brigade had to be summoned to extinguish it.

Most of us assumed that the intense heat must have penetrated to the outside of the main stem and killed the cambium. However the tree came into more or less normal leaf (it always did show a lot of dead twigs and branchlets) in the spring, except that some of the branches which were directly scorched by the flames did die-back. The tree is still in healthy leaf, and even more surprising fruit bodies of the Beefsteak fungus, Fistulina hepatica, one of the fungi which cause decay in oak, have appeared on the charred surface of the wood inside the trunk. Thus neither the oak, nor the fungi rotting it appear to have been seriously damaged by the fire.

AERIAL SPRAYING TRIAL.

We have told you before that one of the jobs of the entomologists is to look out for and test new machines or methods for applying insecticides to forest crops. A recent development in aerial spraying has been the introduction of what are known as "rotary atomisers". These are an alternative to the usual boom fitted with jets for breaking the bulk liquid down into droplets. The rotary atomiser produces droplets on the principle that if a liquid is fed on to a spinning disc it will be thrown off the periphery in droplets of equal size provided the liquid has attained the disc's full circumferential speed. The size of the droplets is controlled by the diameter of the disc and by its speed of rotation.

In aerial spraying, economy can be effected by using the minimum quantity of liquid necessary to cover adequately the area to be treated. The amount of cover obtained is greatly affected by the size of the droplets. From a given quantity of liquid a better cover will be obtained with small droplets than with large ones (provided, of course, that the droplets are not so small that they evaporate before they reach the target or are blown away from the target). For example, applying a spray at one gallon per acre, one would obtain 1,000 droplets per square inch if the droplet diameter was 100 microns and 100,000 droplets per square inch if the droplet diameter was reduced to 20 microns. (A micron is one thousandth of a millimetre). In theory at least, if an adequate cover was 1,000 droplets per square inch, with a droplet diameter of 20 microns one could use one hundredth of a gallon of spray for an acre rather than use one gallon of spray of droplet diameter of 100 microns for the same area; provided, of course, that the first spray, in terms of active ingredient, was one hundred times more concentrated than the second. This seems to becoming rather involved but perhaps the principle emerges!

A second way of effecting economy is to attempt to have all the droplets at or very close to the size that is required. If this is not so, over-small droplets will evaporate or be blown away whilst over-large ones will not cover as large an area as they would have had they been further broken down. Thus droplets of the wrong size are wasteful.

Now the main advantages claimed for rotary atomisers are (1) that droplet size can be closely regulated so that small droplets can be obtained, and (2) that the variability in size of the droplets produced is small. The conventional boom rig does not give such close or even control of droplet size.

We have recently tested an aircraft fitted with rotary atomisers at Tentsmuir Forest where two compartments which had countable but not very high numbers of pine looper in them were sprayed with a formulation containing 10% DDT. One compartment received one gallon of spray per acre (equal to approximately one pound of DDT per acre) and the other received one half gallon of spray per acre (equal to approximately one half pound of DDT per acre). Trays were set out and dead and moribund larvae falling on to them were counted. After a few days, the crowns above the trays were heavily overdosed with DDT fog produced by a "Swingfog" and further counts of larvae falling on to the trays were made. In this way it was possible to compare the numbers of larvae killed by the aerial spraying with the presumed total number of larvae present (i.e. those killed by spraying plus those killed by fogging). The figures obtained have not been fully worked up yet but the indications are that in the one gallon per acre area the kill was about 99% from aerial spraying, and that in the half gallon per acre area the kill was about 80% from aerial spraying. As a first trial these results are rather promising and it may be that rotary atomisers will have a place in any future control schemes that we may have to embark upon.

GROUP DYING OF CONIFERS.

A recent inspection of Chepstow Park, where at one time groups of dying conifers associated with the fungus Rhizina inflata spreading from the sites of fires, (Entopath No.2, p.4; No.4, p.4 and No. 11, p.6-7) were very common indeed, showed a complete absence of new groups. This is particularly interesting because Chepstow Park was one of the first forests where fires in the plantations were banned. Gangs now carry old oil drums which are placed on the rides and used to contain a fire for brewing tea.

FUNGUS ON PINE AT WAREHAM.

Last winter severe browning of Corsican pine was reported from both the Conservancy and Research nurseries at Sugar Hill, Dorset. Inspection of material revealed the presence of an unfamiliar fungus on the needles. This did not resemble any other hitherto reported on pine in Britain, but from characteristics of the spores and fruit bodies it tallied very closely with published descriptions of Septoria acicola (Scirrhia acicola). This fungus has not been recorded in Britain, but causes serious damage on Pinus palustris and other Southern pines in the south of the U.S.A. There it is a major hazard to natural regeneration and would be a most unwelcome addition to the list of needle fungi on our pines.

The symptoms on the Wareham pines were very similar to those described for the American fungus. Infection results in the production of a reddish-brown spot on the needle (the American disease is commonly termed "brown spot"). There is usually a small white incrustation of resin near the centre of the spot, marking the infection site. Then the end of the needle dies. This is about all that can be seen without a microscope, but the whole appearance is quite characteristic. The spores are produced in a microscopic pycnidium immersed in the tissue of the needle. The presence of this fruit body may be recognised by a slight tear in the epidermis of the needle on the brown spot.

When material from Wareham was compared with herbarium material of the true "brown spot" disease however, it was seen that although the two fungi were very similar, they might not be identical. There were slight differences in spore colour, for instance. Work so far suggests that the 'Wareham' fungus and the true "brown spot" are related species. A very important point is that on the Wareham material only a conidial (imperfect) stage has been found. So far no perfect (ascus) stage has appeared. If one exists its discovery would of course be very helpful in identification.

It is important to know how dangerous the Wareham fungus is. Trial inoculations with a spore suspension have resulted in infection of unwounded needles of Corsican pine. Typical brown spots and spores have appeared on green needles within two months of the application of spores. This demonstrates that the fungus can be a primary parasite.

A puzzling feature is its almost complete restriction to the Wareham area. Work is going on to follow up past exports of presumably infected stock from Wareham to other forests and nurseries, but so far there is little evidence that the fungus has established itself elsewhere. The single exception has been from Coed Morganwg in Wales, where it was found causing some browning in a young plantation of Corsican pine. Possibly further investigation will reveal its presence elsewhere in Britain so that its importance on pine may be more accurately assessed.

PLANTING DOUGLAS FIR.

We have known for a long time that Douglas fir had difficulty in establishing itself in cold, wet soil. Everytime we have a spring of this nature we get bundles of dead and dying Douglas fir sent in, with suggestions about the possible presence of Phomopsis or frost damage. In many cases examination discloses that the roots formed in the nursery before planting have died and that no fresh root growth has taken place. This does not necessarily mean that the trees were planted badly, merely that the cold, wet soil into which they were inserted has prevented root development for so long that the existing roots have died.

There is a good deal of evidence, both in this country and abroad, that Douglas fir is easier to establish by late planting, though of course this practice may have its dangers in a really dry spring. Late planting means that the roots soon find themselves in warm soil, so that fresh root growth takes place before the old roots have died.

In seasons which continue damp and cool, the above ground effects of the death of the roots sometimes take a long time to appear. Under moist conditions the plants may manage to produce fresh young shoots on the strength of their own internal reserves, and to keep green for a while thereafter despite the lack of supporting live roots. Eventually, sometimes as late as July, the shoots flag and die-back sets in.

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This year two extreme cases were noted. Douglas fir had been planted, in one case in December, in the other in March, under a very heavy (we would consider a far too heavy) cover of hardwood coppice. With so much shade the soil temperatures must have remained low and the soil nearly saturated for the whole of the summer. Nearly all the plants made new shoot growth, and until August they all looked reasonably healthy. In August some of them started to die-back and many were soon dead. Investigation disclosed that the damaged and dead plants had no live roots at all. For a long time they had been keeping fresh and green, merely because they were in a damp, stagnant atmosphere and so heavily shaded. Even the plants that still appeared healthy above ground had made very little root growth. Some of them had only two or three white active roots. Whether plants with so little root will survive the winter remains to be seen. At any rate it is clear that a severe risk attaches to the planting of Douglas fir under heavy shade in a cold, wet year.

CONFERENCE ON BIOLOGICAL CONTROL.

One of our entomologists recently had the opportunity of spending some days in Prague attending an international conference on insect pathology and biological control. A surprisingly large number of delegates from all over the world were present, evidence of the increasing interest in these subjects. In methods of insect control, as in most other things, fashions change over the years. At the present time the main accent on insect control is the chemical one. A tremendous number of new and very toxic synthetic insecticides have been produced since the end of the war and vast quantities of them are scattered about this planet every year. Not all entomologists, however, are happy about this state of affairs and the meeting in Prague brought together people who believe that insects can and should be controlled in a more "natural" way.

Even in the field of biological control the fashion seems to have changed somewhat. A quarter of a century ago biological control meant in the main the use of other insects, parasites and predators, against insect pests. Organisms such as fungi and nematodes and viruses and bacteria, even although they were known
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to kill insects, were thought to be too difficult and ungovernable to be used in biological control. Now the pendulum has swung over. There is a tacit assumption that the action of insect parasites and predators can only seldom be artificially enhanced and that, generally speaking, success with them can usually be expected only in the case where a pest has been introduced into a new region without its attendant enemies and where the parasites and/or predators are brought in to redress the "balance of nature". In contrast, there is a strong feeling that various insect diseases, particularly those caused by viruses and bacteria, are going to become increasingly important in biological control work. Research is going on apace on locating, storing, culturing and disseminating such insect diseases and we can probably expect big advances in this field in the coming years.

HINTS ON STUMP TREATMENT.

Whether you are using an open paint pot, or a spouted can for the application of creosote to stumps to prevent infection by Fomes annosus, here are two small hints that will make the work easier. Firstly a band of bright paint, yellow is a good colour, should be put round the top of the receptacle. It is then much easier for the feller to see where he last put it down. In a dense wood on a dull winter's day it is possible to waste quite a lot of time looking for 'that bloody creosote pot'. Secondly a rubber ring one third of the way up the handle of the brush, will keep the creosote from working up onto the operator's hands. Canoe paddle rings do the job well, but a narrow strip of inner tube tacked round the handle is just as satisfactory.

Reminder/

REMINDER!!!

Specimens and Descriptions to be sent direct to either the Pathologist or the Entomologist, the minute preferably being in the package with the material.

A copy of the minute and all subsequent correspondence to go via your Conservator

Pathologist	:	FOREST RESEARCH STATION,
	:	ALICE HOLT LODGE,
Entomologist	:	WRECCLESHAM,
	:	FARNHAM, SURREY.

There is no excuse for material arriving dry, now that polythene bags are readily available. Please send all plant material, except very large specimens in such bags. If the material includes insects or any thing that can be crushed, please put the polythene bag into a box to protect it.